# REMARKS

Claims 1-21 and 30-32 were examined. Claims 1 and 30 are amended. Claims 1-21 and 30-32 remain in the Application.

## 35 U.S.C. §102(b): Rejection of Claims 1-10, 12-20 and 30-31 with EP1022587A1

The Patent Office rejected claims 1-10, 12-20 and 30-31 under 35 U.S.C. §102(b) as anticipated by European Patent Application publication EP1022587A1 (hereinafter referred to as "EP '587"). Applicants respectfully submit that the claims are allowable over EP '587.

### Claims 1-10 and 12-20

Claim 1 relates to an apparatus comprising a substrate and a coating composition on a surface of the substrate. The coating composition includes a plurality of deposited layers. Included among the plurality of deposited layers is a layer comprising a colloid of a plurality of dispersed crystalline metal particles. One way the layer of dispersed particles is formed is described in the Application at, for example, page 4, paragraphs 0013-0014, where crystalline particles are combined/modified with a condensation product of an organosilane and combined with a dispersing agent and optional solvent to form a colloid of a desired concentration. The colloid may be introduced by an operation such as a spinning operation. To stabilize the colloid introduced by a spinning operation, the spinning may continue after introduction.

Introducing a layer comprising a colloid of a plurality of dispersed crystalline metal particles imparts distinctive structural characteristics to the final coating composition. In particular, the layer of dispersed particles formed through a colloid tends to be porous as the solvent evaporates. A subsequent layer, such as a layer comprising a radiation-curable material, introduced thereon will tend to fill the pores and become a binder for the multi-layer composition.

As understood by Applicants, EP '587 discusses an anti-reflective film including low and high refractive index layers composed of particles and polymer or cross-link polymer as a binder (e.g., Abstract). The high refractive index layer and the low refractive index layer, both contain materials that may be polymerized (see, e.g., page 19, lines 15-36). Accordingly, each layer

must be cured after deposited as taught by the reference. EP '587 does not teach or suggest a layer including a crystalline metal compound introduced through a solvent.

EP '587 discusses particles bound with a polymer. Accordingly, EP '587 does not disclose a layer comprising a colloid including crystalline metal particles. For the above stated reasons, claim 1 is not anticipated by EP '587. In discussing its rejetion to claims 30 AND 31 and an apparatus including a layer comprising a colloid, the Patent Office cites page 6, paragraph 0053 that teaches dispersing particles in a liquid medium using a "colloid mill." A colloid mill is a particular type of mill that generally operates by passing mixed phases of an emulsion between a stator and a high-speed rotor to produce a shearing action which yields a fine dispersion. See Reminton's Pharmaceutical Sciences, 14th Ed., pp. 1494-95 (1970), attached as Appendix A. Dispersing particles in liquid using a colloid mill does not mean that a colloid is necessarily formed. Using the Patent Office's logic, that would mean that a colloid is also formed using a sand mill grinder, a high speed impellar mills, a pebble mill, a roller mill or an attriter which EP '587 lists as alternative dispersing machines.

Claims 2-10 and 12-20 depend from claim 1 and therefore include all the limitations of that claim. For at least the reasons stated with respect to claim 1, claims 2-10 and 12-20 are not anticipated by EP '587. Applicants respectfully request the Patent Office withdraw the rejection to claims 1-10 and 12-20 under 35 U.S.C. §102(b).

Claims 30-31

Claim 30 relates to an apparatus comprising a substrate including a transparent material and an anti-reflective coating composition on a surface of the substrate. The coating composition includes a plurality of deposited layers. Included among the plurality of deposited layers is a first deposited layer over the substrate. The first layer includes a colloid including dispersed particles of a crystalline metal compound and a condensation product of an organosilane. Also included among the plurality of deposited layers is a second deposited layer over the first layer. The second layer has a different refractive index than the first layer, and the second layer comprises a radiation-curable layer.

As understood by Applicants, EP '587 does not teach or suggest a layer including a colloid including dispersed particles of a crystalline metal compound and a condensation product

of an organosilane.

For the above stated reasons, claim 30 is not anticipated by EP '587. Claim 31 depends from claim 30 and therefore includes all the limitations of that claim. For at least the reasons stated with respect to claim 30, claim 31 is not anticipated by EP '587. Applicants respectfully request the Patent Office withdraw the rejection to claims 30-31 under 35 U.S.C. §102(b).

**35 U.S.C. §103(a): Rejection of Claims 11, 21, and 32 with EP '587 and Taniguchi**

The Patent Office rejects claims 11, 21, and 32 under 35 U.S.C. §103(a) as obvious over EP '587 in view of U.S. Patent No. 4,765,729 issued to Taniguchi (Taniguchi).

Claims 11 and 21 are *prima facie* not obvious over the cited references, because the references do not disclose an apparatus including a substrate and a coating composition comprising a plurality of layers, at least one of the plurality of layers comprising a colloid of a plurality of dispersed crystalline metal particles. Claim 32 is *prima facie* not obvious over the cited references, because the references do not disclose an apparatus including a substrate and a coating composition comprising a layer including a colloid including dispersed particles of a crystalline metal compound and a condensation product of an organosilane. The discussion above is relevant on this point. Taniguchi does not describe such layer. Further, there is no motivation from the cited references for such a combination.

Applicants respectfully request that the Patent Office withdraw the rejection of claims 11, 21, and 32 under 35 U.S.C. §103(a).

## Conclusion

In view of the foregoing, it is believed that all claims now pending patentably define the subject invention over the prior art of record and are in condition for allowance. Applicants respectfully request that the rejections be withdrawn and the claims be allowed at the earliest possible date.

## Request For Telephone Interview

The Examiner is invited to call William Thomas Babbitt at (310) 207-3800 if there remains any issue with allowance of the case.

## Request For An Extension Of Time

Applicants respectfully petition for an extension of time to respond to the outstanding Office Action pursuant to 37 C.F.R. § 1.136(a). Please charge our Deposit Account No. 02-2666 to cover the necessary fee under 37 C.F.R. § 1.17 for such an extension.

## Charge Our Deposit Account

Please charge any shortage to our Deposit Account No. 02-2666.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN, LLP

Dated: 1/24/05

William V Babbitt

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I hereby certify that this correspondence is being deposited with the United States Postal Service on the date shown below with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Nedy Calderon 1/24/05

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**Agitators**—Ordinary agitation or shaking may be used to prepare the emulsion. This method is frequently employed by the pharmacist, particularly in the emulsification of the easily dispersed, low-viscosity oils. Under certain conditions, intermittent shaking is considerably more effective than ordinary continuous shaking. Continuous shaking tends to break up not only the phase to be dispersed but also the dispersion medium and, in this way, impairs the ease of emulsification. Laboratory shaking devices may be used for the small-scale production of emulsions. However, Clayton[24] claims that shaking is an inferior method for the production of emulsions "because, as the emulsion becomes more perfect, the smashing action between the relatively heavy and light particles becomes more feeble, whereas the smashing forces should be increased."

The mortar and pestle are widely used by the prescription pharmacist in the extemporaneous preparation of emulsions. This equipment has very definite limitations because its usefulness depends largely on the viscidity of the emulsifying agent. A mortar and pestle cannot be used to prepare an emulsion if the emulsifying agent lacks viscidity (eg, gelatin solutions). These emulsifying agents will produce stable emulsions only if other types of equipment are used to mix the ingredients and the agent together.

Small electric mixers may be used to prepare emulsions at the prescription counter. These mixers will save time and energy and product satisfactory emulsions when the emulsifying agent is acacia or agar. However, these mixers cannot be used if the emulsifying agent is gelatin.

The commercially available *Waring Blendor* disperses efficiently by means of the shearing action of rapidly rotating blades. This mixer transfers large amounts of energy and incorporates air into the emulsion. If an emulsion is first produced by using a blender of this type, the formulator must remember that the emulsion characteristics obtained in the laboratory will not necessarily be duplicated by the production-size agitators.

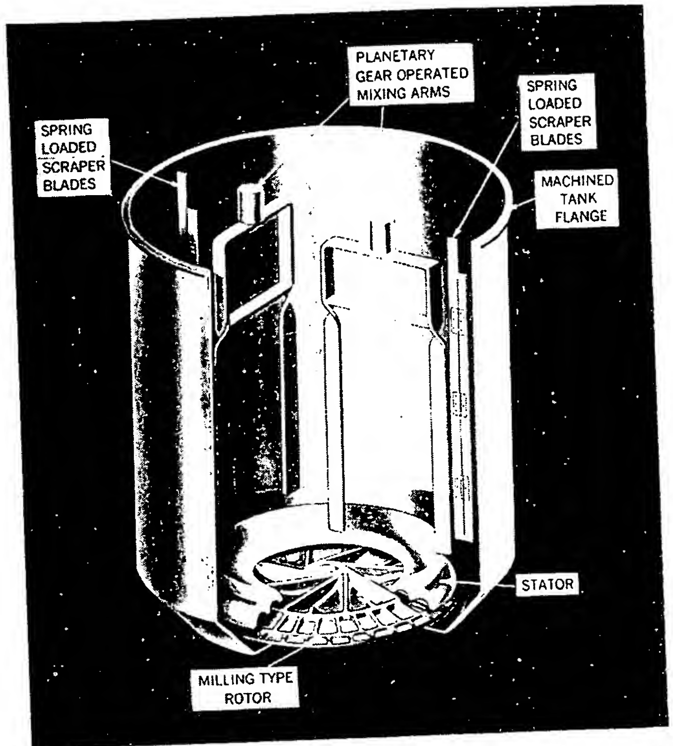



Fig. 525. Standard paste-type dispersall mixer with "cupped-rotor" milling element and double-rotating mixing arm circulating element (courtesy, Abbe Engineering).

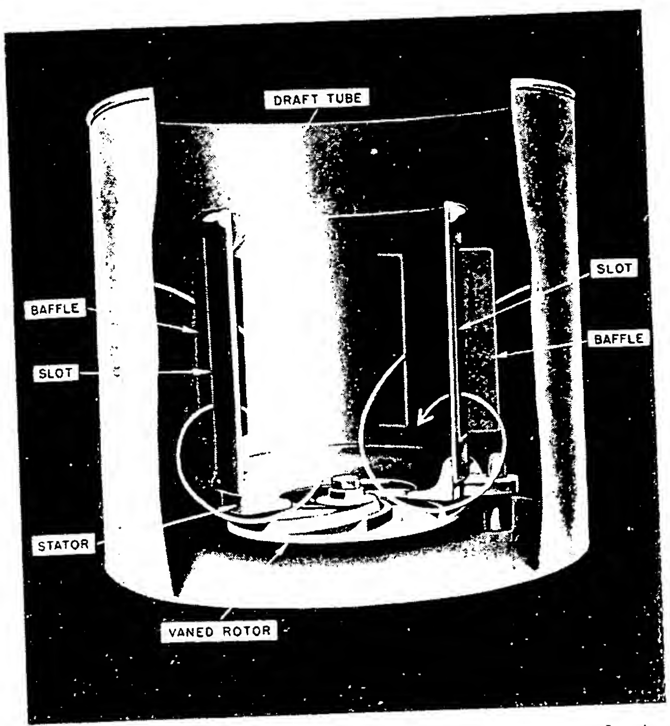



Fig. 524. Standard slurry-type dispersall mixer with vaned-rotor "mixing" element and slotted draft-tube circulating element (courtesy, Abbe Engineering).

Production-size agitators include high-powered propeller shaft stirrers immersed in a tank or self-contained units with propeller and paddle systems. The latter units are usually so constructed that the contents of the tank may be either heated or cooled during the production process. Baffles are often built into a tank and these increase the efficiency of agitation. Two mixers manufactured by the same company are shown in Figs. 524 and 525.

**Colloid Mills**—The principle of operation of the colloid mill is the passage of the mixed phases of an emulsion formula between a stator and a high-speed rotor revolving at speeds of 2000–18,000 rpm. The clearance between the rotor and the stator is adjustable, usually from 0.001 in. upward. The emulsion mixture, in passing between the rotor and stator, is subjected to a tremendous shearing action which effects a fine dispersion. Two of the many types of colloid mills on the market are shown in Figs. 526 and 528. The operating principle is the same for all but each manufacturer incorporates specific features which result in changes in operating efficiency. The shearing forces applied in the colloid mill may result in a temperature increase within the emulsion. It may be necessary, therefore, to cool the equipment when the emulsion is being produced.

**Homogenizers and Viscolizers**—In the viscolizer and the homogenizer, the mixed phases are passed between a finely ground valve and seat under high pressure. This, in effect, produces an atomization which is enhanced by the impact received by the atomized mixture as it strikes the valve head. This type of apparatus operates at pressures of 1000–5000 lb/sq in. and produces some of the finest dispersions obtainable in an emulsion.

Homogenizers may be used in one of two ways: (1) the ingredients in the emulsion are mixed and then

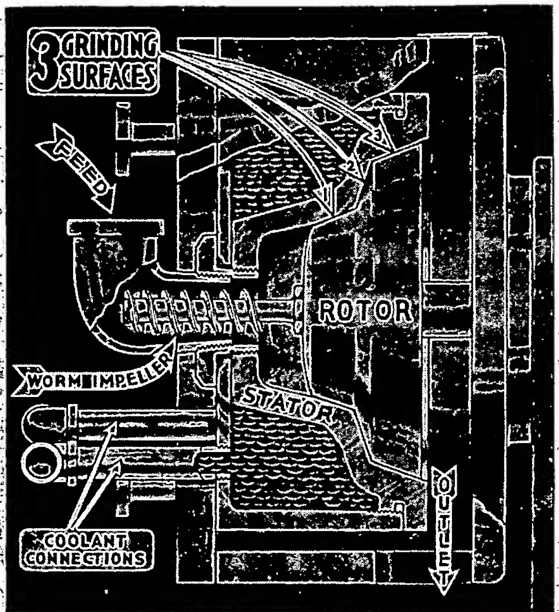



Fig. 526. A colloid mill shown in cross section (courtesy, Tri-Homo).

passed through the homogenizer to produce the final product; or (2) an emulsion is prepared in some other way and is then passed through a homogenizer for the purpose of decreasing the particle size and obtaining a greater degree of uniformity and stability.

Two-stage homogenizers (Fig. 529) are so constructed that the emulsion, after treatment in the first valve system, is conducted directly to another where it receives a second treatment. A single homogenization may produce an emulsion which, although its particle size is small, has a tendency to clump or form clusters. Emulsions of this type exhibit increased creaming tendencies. This is corrected by passing the emulsion through the first stage of homogenization at a high pressure (eg, 3000–5000 lb/sq in.) and then through the second stage at a greatly reduced pressure (eg, 1000 lb/sq in.). This breaks down any clusters formed in the first step.

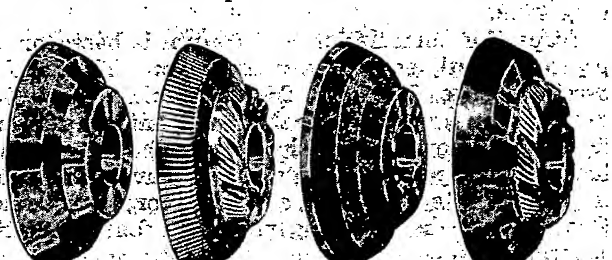
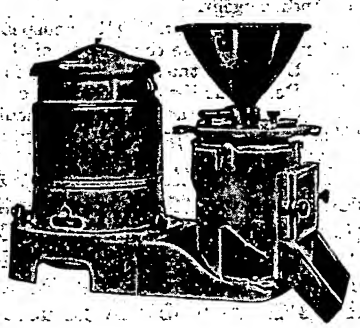


Fig. 527. Types of rotors used in colloid mills. These may be smooth (for emulsification of most emulsions), serrated (for the emulsification of ointments and very viscous products), or of vitrified stone (for the emulsification of paints and pigment dispersions) (courtesy, Tri-Homo).

Fig. 528. The Premier colloid mill, a gravity flow, vertical colloid mill with only one moving member, the rotor. Adjustment of clearance between the rotor and stator can be made from 0.001 in. upward. Speeds range from 3600 to 17,600 rpm for this type of mill, which may be used for the even and uniform distribution of the ingredients in a wide range of pharmaceutical products.



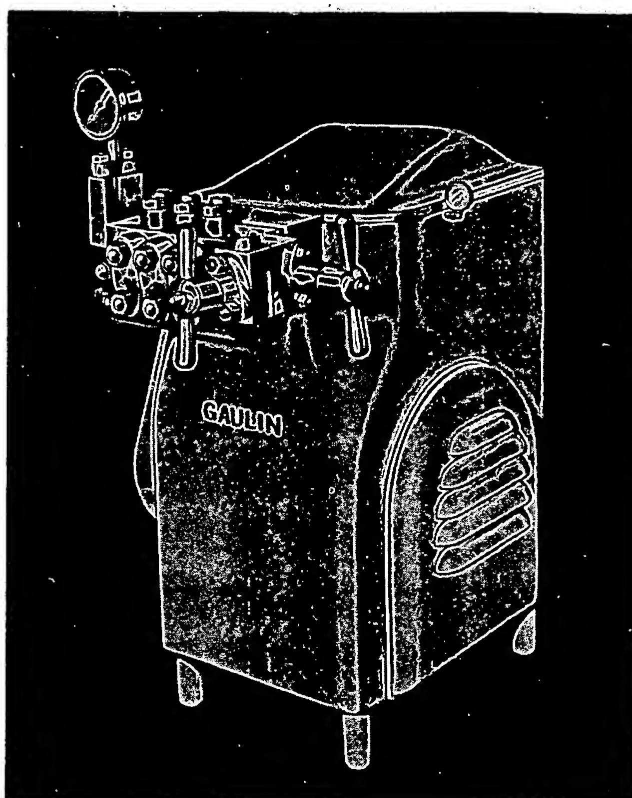



Fig. 529. Two-stage homogenizer (courtesy, Manton Gaulin).

For small-scale extemporaneous preparation of emulsions, the inexpensive *hand homogenizer** is particularly useful. It is probably the most efficient emulsifying apparatus available to the prescription pharmacist. The two phases, previously mixed in a bottle, are hand pumped through the apparatus. Recirculation of the emulsion through the apparatus will improve its quality.

A homogenizer does not incorporate air into the final product. Air may ruin an emulsion because the emulsifying agent is preferentially adsorbed at the air/water interface. This is followed by an irreversible precipitation termed *denaturization*. This is particularly prone to occur with protein emulsifying agents.

Homogenization may spoil an emulsion if the concentration of emulsifying agent in the formulation is less than that required to take care of the increase in surface area produced by the process.

The temperature rise during homogenization is not very large. However, temperature does play an important role in the emulsification process. An increase in temperature will reduce the viscosity and, in certain instances, the interfacial tension between the oil and the water. There are, however, many instances, particularly in the manufacturing of cosmetic creams and ointments, where the ingredients will fail to emulsify properly if they are processed at too high a temperature. Emulsions of this type are first processed at an elevated temperature and then homogenized at a temperature not exceeding 40°C.

The Marco Flow-Master Kom-bi-nator (Fig. 530) employs a number of different actions, each of which takes the ingredients a little further along in the process of subdividing droplets until complete homogenization results. The machine is equipped with a pump

* Hand homogenizers are available from Medical Times (see page 2023).